SR2MOD02 and SR2MOD03

Wireless Modem
User Guide

11/2013

Schneider Electric

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

No part of this document may be reproduced in any form or by any means, electronic or mechanical, including photocopying, without express written permission of Schneider Electric.

All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

Table of Contents

Safety Information

Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

About the Book

At a Glance

Document Scope

This manual describes how to install, configure, and use the SR2 MOD02 and SR2 MOD03 modems, based on descriptive information and how-to procedures.

The modem uses the wavecom module quad-Band version 850/900/1800/1900 MHz (Europe bands: 900/1800 MHz and U.S. bands: 850/1900 MHz) and GSM class 10.

This manual describes 2 modem references based upon the controllers supported:

- **Smart relays**
  - Zelio logic of Schneider Electric
  - Modem reference: SR2 MOD02
  - Identified by marking on the modem and the labels

- **Programmable controllers**
  - Twido of Schneider Electric
  - Modem reference: SR2 MOD03
  - Identified by marking on the modem and the labels

NOTE: Read and understand this document before installing, operating, or maintaining the SR2 MOD02 and SR2 MOD03 modems.

Validity Note

This document has been updated with the release of SR2MOD02/03 V1.0.

Related Documents

For more information refer to the Online Help of Zelio Soft 2 Programming Software and to the Online Help of Twido Suite Programming Software.

Product Related Information

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power from the equipment including connected devices before removing any covers or doors, installing or removing any accessories, hardware, cables, or wires.
- Use properly rated voltage sensing device to confirm the power is off.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

Failure to follow these instructions will result in death or serious injury.

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any result arising out of the use of this material.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Only use software approved by Schneider Electric for use with this equipment.
- Update your application program every time you change the physical hardware configuration.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ WARNING

LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop, power outage and restart.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines.[1]
- Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

---

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation, and Operation of Adjustable-Speed Drive Systems" or their equivalent governing your particular location.

Chapter 1
Introduction

Overview

This chapter describes the various features and the specific regulations of the SR2 MOD02/03 modem.

What Is in This Chapter?

This chapter contains the following topics:

Product Information

General

This equipment contains Licensed Transmitter FCC ID N7NQ2687, IC ID 2417C-Q2687.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
1. this device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

It is necessary to follow the specific regulations for the use of radio operator equipment. In particular the possible risks of radio frequency interference (RFI).

Restrictions of use for radio operator equipment in:
● Fuel depots.
● Chemical factories.
● Locations where demolition is under way.
● Other places where signs indicate that the use of cellular telephones is prohibited or dangerous.

⚠ DANGER

POTENTIAL FOR EXPLOSION

● Install and use this equipment in non-hazardous locations only.
● Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.

Failure to follow these instructions will result in death or serious injury.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, interference may occur in a given or particular installation nonetheless. If this equipment does cause harmful interference to radio, television or other communication device transmission/reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference.

> ## ⚠ **WARNING**
>
> **ELECTROMAGNETIC INTERFERENCE**
>
> - Reorient or relocate the modem antenna if you experience communication interference with other devices.
> - Increase the separation distance between equipment subject to electromagnetic interference and the modem / antenna.
> - Connect equipment subject to electromagnetic interference into a power outlet on a circuit different from that to which the modem is connected.
> - Consult your local Schneider Electric representative if you are unable to resolve electromagnetic interference issues that may arise in conjunction with the use of the modem.
>
> **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

This equipment complies with FCC's radiation exposure limits set forth for an uncontrolled environment under the following conditions:

1. This equipment should be installed and operated such that a minimum separation distance of 20.3 cm (8 in) is maintained between the radiator (antenna) and the body of the user or nearby person at all times.
2. This transmitter must not be collocated or operating in conjunction with any other antenna or transmitter.

> ## ⚠ **WARNING**
>
> **ELECTROMAGNETIC RADIATION EXPOSURE**
>
> - Do not operate the modem, or have the antenna placed, within 20.3 cm (8 in) of anyone.
> - Do not use any other antenna than that supplied with the modem.
> - Do not share the use of the modem antenna with any other device.
> - Do not locate the modem antenna in proximity to another antenna or radio transmitting device.
>
> **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

There can be a hazard associated with the use of your GSM modem close to insufficiently protected medical devices such as acoustic apparatus and pacemakers. Consult the manufacturers of medical equipment to determine if they are adequately protected. If the equipment is insufficiently protected, then the use of your GSM modem in close proximity to other electronic equipment can also cause interference. Observe all recommendations for the equipment from the manufacturer.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Do not use this product in safety critical machine functions.
- Use approved appropriate hard-wired safety interlocks where personnel and/or equipment hazards exist.
- Do not disassemble, repair, or modify the products.
- Use this equipment only in a properly rated enclosure.
- Use a 2.5 A, 250 V fuse designed to Type F standards as per IEC 60127 that are UL recognized and CSA approved for the power supply line.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ CAUTION

INOPERABLE EQUIPMENT

- Do not open the modem housing.
- Return the modem to the seller in case any damage is detected.

Failure to follow these instructions can result in injury or equipment damage.

Power Supply

The modems require a power supply rated between 5.5 and 32 Vdc. To conform to UL and CSA regulations, the power supply must be of a type Class III SELV (Safety Extra Low Voltage) certified and conforming to CSA/UL 60950-1 (2nd Edition). The power supply must be isolating, grounded (earthed) and current limited to a maximum of 100 VA.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Do not connect the equipment directly to line voltage.
- Use only Class III, isolated SELV limited energy power supply not to exceed 100 VA.

Failure to follow these instructions will result in death or serious injury.

Care and Maintenance

NOTICE
UNINTENDED MAINTENANCE EQUIPMENT
● Do not expose the modem to the extreme environments such as a high temperature or a high humidity content.
● Do not use or store the modem in dusty or dirty places.
● Do not open or disassemble the modem.
● Do not expose the modem to liquids.
● Avoid dropping, striking, or shaking the equipment violently.
● Do not place the modem near computer disks, credit or voyage cards, or other magnetic media.
Failure to follow these instructions can result in equipment damage.

Features

Modem Features

The table shows the various features of the SR2 MOD02/03 modem:

Modem	
GSM functions	Quad-bands 900/1800 MHz and 850/1900 MHz
	ETSI GSM phase 2+: ● Class 4 (2 W at 850/900 MHz) ● Class 1 (1 W at 1800/1900 MHz)
	SIM toolkit release 99
Data features	Supports PBCCH, coding schemes: CS1 and CS4
	TCP/IP Library (PPPRFC, TCP socket, UDP socket, SMTP, POP3, FTP)
	Asynchronous data circuit, transparent, and non-transparent, 9600 bps (standard) up to 14,400 bps (depending on network)
	Compatible fax group 3
	SMS point-to-point MT/MO and SMS CB
Memory type interfaces	Flash 32 Mbits and SRAM 4 Mbits (32/4)
Interfaces	Antenna GSM: SMA-F connector
	Power supply: 5.5...32 Vdc (micro-FIT connector)
	RS 232 via female 9-pin SUB-D connector
	AT commands: GSM 07.05 and 07.07
	SIM reader (SIM 3 V–1.8 V)
	DIN (35 mm) Rail mounting clip
Supplied accessories	Mounting brackets (x 2)
	Power supply cable - 2-wire micro FIT
	GSM magnetic antenna (SMA-M)
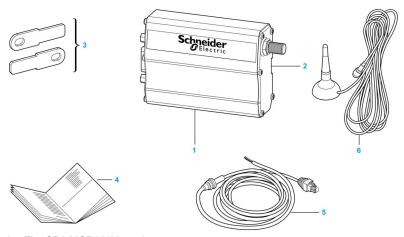
Chapter 2
Package Contents and Labels

Package Contents and Labels

Overview

This figure illustrates the contents included in the modem package:

1 The SR2 MOD02/03 modem.
2 DIN 35 mm (1.38 in.) rail mounting clip.
3 2 mounting brackets.
4 Instruction Sheet.
5 2-wire power cable (Red/Black) with in-line fuse (2.5 A/250 V).
6 GSM magnetic antenna with connection cable (2500±100 mm) and SMA male connector.

Chapter 3
General Presentation

Overview

This chapter describes the modem description, functional description, and technical characteristics of the SR2 MOD02/03 modem.

What Is in This Chapter?

This chapter contains the following sections:

Section 3.1
Modem Description
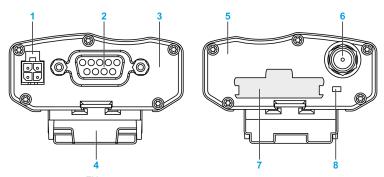
Physical Description

Description of the Modem

This figure provides the description of the modem:

1 Micro FIT 3.0^{TM} female 4-pin connector for the electrical supply
2 Female sub D 9-Pin connector for RS 232
3 Front side
4 Optional DIN rail mounting clip
5 Rear side
6 SMA female antenna connector: The GSM antenna connector is a 50 Ω impedance female SMA type
7 SIM card cover
8 GSM modem activity LED

External Connections

GSM Antenna Connector

The GSM antenna connector is a 50 Ω impedance female SMA type.

4-Pins Micro FIT Female Connector

The connector allows the connection of an external DC supply.

This table describes the connector pin assignment:

Pin Assignment	Pin Number	Signal
	1	5.5...32 Vdc
	2	0 Vdc
	3	N.C.
	4	N.C.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Do not connect wires to unused terminals or terminals marked "Not Connected (N.C.)".

Failure to follow these instructions can result in death, serious injury, or equipment damage.

9-Pins Sub D Female Connector
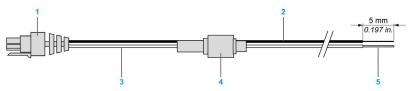
The table describes the connector pin assignment:

Pin Assignment	Pin Number	Pin Name	Circuit (V24 - RS232C)	I/O
5　1　9　6	1	Signal detection	DCD	O
	2	Data reception	RXD	O
	3	Data transmission	TXD	I
	4	Data terminal ready	DTR	I
	5	Protective earth ground	GND	–
	6	Data set ready	DSR	O
	7	Request to send	RTS	I
	8	Clear to send	CTS	O
	9	Ring indicator	RI	O

Accessories
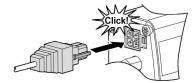
2-Wires Micro FIT Supply Cable

This figure illustrates the cable supplied with the modem:
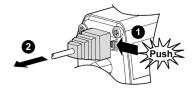
1 Molex connector micro FIT 3.0
2 Black wire (0 Vdc)
3 Red wire (+Vdc)
4 Fuse 2.5 A/250 V fast blow (5 x 20 mm/0.2 x 0.79 in.)
5 Tinned copper wire

This figure describes how to connect the cable to the modem:

This figure describes how to disconnect the cable from the modem:

This table illustrates the connector from cable side and describes its components and characteristics:

View	Component	Characteristics
	4-pins micro FIT connector	Type: Molex
	Cable	1500 mm (59.1 in.)
	Wire section/Gauge	Tinned copper 24 x 0.2 mm (0.94 x 0.01 in.) Surface area: 0.75 mm^2 (18 AWG)

GSM Magnetic Antenna (SMA-M)

The GSM magnetic antenna is designed for vertical installation on a metallic support. Its SMA male connection allows it to be directly connected to the modem.

This table illustrates the GSM magnetic antenna and describes its components and characteristics:

View	Component	Characteristics
	SMA-M antenna	Quad-bands: 850/900/1800/1900 MHz
	Cable	2500±100 mm (59.1±3.94 in.)
	Coaxial	RG174 - Ø 2.54 mm (Ø 0.10 in.)
	Dimensions	Base: Ø 30 mm (Ø 1.18 in.) Total height: Ø 70 mm (Ø 2.76 in.)

Section 3.2
Functional Description

Overview

This section provides information about the power supply and RS 232 serial link of the SR2 MOD02/03 modem.

What Is in This Section?

This section contains the following topics:

Power Supply

Description

Use an external, regulated DC power source designated as Class III, Safety Extra Low Voltage (SELV) between 5.5...32 Vdc to power the modem (V+BATTERY). An internal DC/DC converter provides the modem with internal DC voltages. The modem will not function correctly if the input voltage (V+BATTERY) falls below 5.5 Vdc.

NOTE: An in-line 2.5 A/250 V fast blow fuse in the power supply cable supplied with the modem helps protect the power supply cable.

It also helps protect the modem against power supply spikes of more than 32 Vdc.

Filter specifications:
● Input/output EMI/RFI protection
● Signal smoothing

RS 232 Serial Link

General

The RS 232 interface provides a level translation between the GSM module (DCE) and the PC COM port (DTE). The RS 232 interface is secured internally (ESD shielding) against external electrostatic spikes.
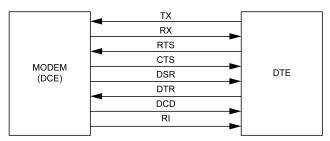
Filter specifications:
● Input/output EMI/RFI reduction
● Signal smoothing

The following signals are available in this link:
● TX data (TX)
● RX data (RX)
● Request to send (RTS)
● Clear to send (CTS)
● Data terminal ready (DTR)
● Data set ready (DSR)
● Data carrier detect (DCD)
● Ring indicator (RI)

This figure illustrates the signals exchanged by the modem:

NOTE: The RS 232 interface allows a certain amount of flexibility in the use of its signals. For example, the modem operates in the 3-wire mode using only the TX, RX and GND signals.

Mode Autobaud

The auto-baud mode allows the modem to detect the transmission speed used by the DTE. Only the following speeds are detected: 2400, 4800, 9600, 19,200, 38,400 bps, and 57,600 bps. Auto-baud detection is not reliable for speeds below or above the given values. The auto-baud mode is controlled by the AT commands.

To see this function explained in detail, refer to the description of the AT baud rate command in Appendix A.

Section 3.3
Technical Characteristics

Overview

This section provides information about the mechanical, electrical, and environmental characteristics and the standards/conformities of the SR2 MOD02/03 modem.

What Is in This Section?

This section contains the following topics:

Topic	Page
Mechanical Characteristics	30
Electrical Characteristics	31
Environmental Characteristics	34
Standards/Conformities	35
Protections	36

Mechanical Characteristics

General
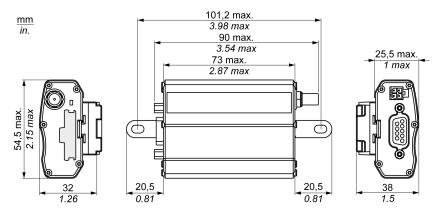
This table describes the mechanical characteristics of the modem:

Mechanical Characteristics	
Dimensions	73 x 54.5 x 25.5 mm (2.87 x 2.14 x 1 in.) (without connectors)
Overall dimensions	90 x 54.5 x 25.5 mm (3.54 x 2.14 x 1 in.)
Weight	88 g (3.1 oz) (modem only) < 335 g (11.8 oz) (modem and accessories)
Volume	101.5 cm^3 (39.96 in.^{3})
Case	Extruded aluminum
Ingress protection	IP31

This figure describes the dimensions of the modem and the clearances necessary for installation:

Electrical Characteristics

Power Supply

The operating voltage range is between 5.5...32 Vdc.

To conform to UL and CSA regulations, the power supply must be of a type Class III SELV (Safety Extra Low Voltage) certified and conforming to CSA/UL 60950-1 (2nd Edition). The power supply must be isolating, grounded (earthed) and current limited to a maximum of 100 VA.

> ## ⚠ DANGER
>
> **HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH**
>
> - Do not connect the equipment directly to line voltage.
> - Use only Class III, isolated SELV limited energy power supply not to exceed 100 VA.
>
> **Failure to follow these instructions will result in death or serious injury.**

NOTE: The modem remains under power as long as it is connected to a power supply that is itself under power.

If the Voltage:	Then
< 5.5 Vdc	GSM communication cannot operate properly.
> 32 Vdc (transient peaks)	The modem has built-in protection.

Power Supply Consumption

This table describes the power supply consumption [1] of the modem without the RS 232 connected:

CONDITIONS T = 25 ºC (77 ºF) and 3 Vdc SIM Card		850/900 MHz		1800/1900 MHz	
		I Nominal (mA)	I Maximal (mA)	I Nominal (mA)	I Maximal (mA)
Idle mode [2]	5.5 V	17.5	23	17.5	23
	12 V	11.7	16.5	11.7	16.5
	24 V	10	14	10	14
	32 V	8.6	11.5	8.6	11.5
Idle mode 32 K [3]	5.5 V	12	14.5	12	14.5
	12 V	9.2	11.3	9.2	11.3
	24 V	8	10.5	8	10.5
	32 V	7.7	9.7	7.7	9.7
In communication GSM 1RX/1TX Power (2 W/1 W)	5.5 V	182.5	195.5	135	145
	12 V	96	103.5	71.75	78
	24 V	50	54	37	40
	32 V	40	44.5	31	34.75
During TX bursts Power (2 W/1 W)	5.5 V	1178	1400	670	780
	12 V	600	712	342	400
	24 V	320	375	180	220
	32 V	230	274	132	156

(1) The power consumption can vary by 5% over the whole operating temperature range –20 ºC...55 ºC (–68...131 ºF).
(2) Idle mode: The modem is registered on the network but not in communication.
(3) Idle mode 32 K: The low-power mode controlled by an external application via the DTR CTS signals.

Electrical Characteristics of the SIM Interface

The electrical characteristic of the SIM card is 1.8 Vdc or 3 Vdc.

GSM/DCS Frequency Bands

This table describes the frequency ranges:

Parameter	GSM 850	E-GSM 900	DCS 1800	PCS 1900
Transmission frequency	824...849 MHz	880...915 MHz	1710...1785 MHz	1850...1990 MHz
Reception frequency	869...894 MHz	925...960 MHz	1805...1880 MHz	1930...1990 MHz

RF Performances

The RF performances are compliant with the ETSI GSM 05.05 recommendation.

This table describes the RF performances for receiver and transmitter:

Receiver	
E- GSM900/GSM850 reference sensitivity	–104 dBm
DCS1800/PCS1900 reference sensitivity	–102 dBm
Selectivity @ 200 kHz	> 9 dBc
Selectivity @ 400 kHz	> 41 dBc
Linear dynamic range	63 dB
Co-channel rejection	≥ 9 dBc

Transmitter at Ambient Temperature	
Maximum output power (E-GSM900/GSM850)	33 dBm ±2 dB
Maximum output power (DCS1800/PCS1900)	30 dBm ±2 dB
Minimum output power (E-GSM900/GSM850)	5 dBm ±5 dB
Minimum output power (DCS1800/PCS1900)	0 dBm ±5 dB

External GSM Antenna

The external GSM antenna is connected to the modem via the SMA/M connector.

This table describes the external GSM antenna characteristics:

External GSM Antenna Characteristics	
Antenna frequency range	Quad-bands 850/900/1800/1900 MHz
Impedance	50 Ω nominal
DC impedance	0 Ω
Gain (antenna + cable)	0 dBi (in a minimum direction)
VSWR (Rx max TX max)	1.5:1
Polarization	Linear

Environmental Characteristics

General

This table describes the environmental characteristics of the modem:

Environmental Characteristics	
Operating temperature	–20...55 ºC (–68...131 ºF)
Storage temperature	–40...70 ºC (–104...158 ºF)
Operating humidity without condensation	HR < 95% at 55 ºC (131 ºF)

Standards/Conformities

Description

The product conforms to the following requirements:
- R&TTE 1999/5/EC directive
- Regulations of standard ETSI EN 301 489-7, EN 301 419-1, and EN 301 511
- 2002/96/CE DEEE

The modem conforms to the 2002/95/CE - RoHS requirements.

The modems conform to standards described in the Declaration of Conformity which can be found at www.schneider-electric.com.

Protections

Power Supply

An in-line fuse in the power supply cable that is supplied with the modem, helps protect the power supply cable.

This table describes the fuse type:

Fuse type	FSD 2.5 A/250 V FAST

Over-Voltage

The modem design helps protect it against voltages over 32 Vdc. The power supply is disconnected in order to help protect the internal components against over-voltage when the supply voltage exceeds 32 Vdc.

ESD

The modem withstands ESD on all accessible parts of the modem (except for the RF part) according to the IEC 61000-4-2 requirements:
- 8 kV air discharge
- 4 kV contact discharge

Miscellaneous

Filter specifications:
- Input/output EMI/RFI reduction
- Signal smoothing

Chapter 4
Installing the Modem

Overview

This chapter describes how to mount, install, and remove the SR2 MOD02/03 modem.

What Is in This Chapter?

This chapter contains the following topics:
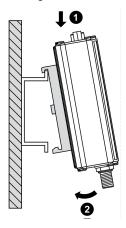
Mounting the Modem

Mounting Using DIN Rail Mounting Clip

The modem is supplied with a DIN rail mounting clip mounted on the case. The DIN rail mounting clip allows mounting on a DIN Rail IEC/EN 60715/DIN 35 x 7.5 mm (1.38 x 0.3 in).
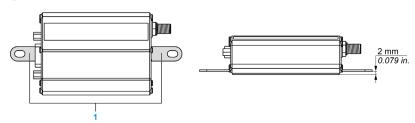
Execute step 1 (pressure) to mount the modem on DIN rail, then step 2 (pivot).

This figure describes the step 1 and step 2 of mounting the modem:

Mounting Procedure Using 2 Mounting Brackets

Use the supplied mounting brackets when surface mounting the modem as shown in the given figure:

1   Mounting brackets

Refer also to the drilling dimensions .

NOTE: The modem has to be mounted to a flat surface when applying the mounting brackets. The maximum height of the screw head is 2 mm.

This table describes the removal of the mounting brackets:

Step	Action
1	Remove the DIN rail mounting clip before installing the surface mounting brackets.
2	Remove the 2 mounting clips retaining the screws.
3	Slide the mounting clip off the modem.
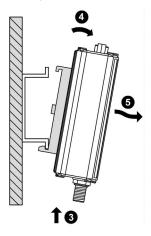
Removing the Modem

Removing Using DIN Rail Mounting Clip

The DIN rail mounting clip allows removal of the modem from a DIN rail IEC/EN 60715/DIN 35 x 7.5 mm (1.38 x 0.3 in).

Execute step 3 (pressure) to remove the modem from the DIN rail, then steps 4 and 5 (pivot and remove).

This figure describes the steps 3, 4, and 5 of removal procedure:
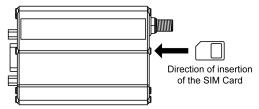
Modem Installation

Description

To install the modem, perform the following operations with the modem turned off:
- Remove the SIM card cover on the rear side.
- Insert the SIM card into its holder.

Direction of insertion
of the SIM Card

- Replace and secure the SIM card cover.
- Connect the antenna to the SMA connector.
- Connect the 9-pin sub D connector of the modem to the controller using a cable.
- Connect the power supply cable to an external, regulated DC power source.
- Connect the power supply cable to the modem and activate the power supply. The modem selects the network band and the GSM LED illuminates.
- The modem is now ready to be configured.

Refer to AT Commands for the description of the commands.

Network Bands Scanning

With the SIM card installed and after applying power, the modem automatically scans the European network bands in order to select the proper frequency. In case such a frequency cannot be established, the modem will then start to scan the North American network bands. This cycle is repeated until a valid network is found. After detection of the GSM network, it is saved in the memory of the modem.

If the SIM card is replaced with another, this procedure will be automatically reinitialized.

NOTE: If the modem frequency is selected for use in a specific area (Europe for instance), and is then introduced in a different area (the U.S., for instance), remove and replace the SIM card while the modem is still under power. This action causes the modem to detect that a reinitialization is required even if the same SIM card is reinserted back in the modem.

GSM LED Status

The GSM LED that is located on the side of the modem *(see page 21)* indicates the state of the modem.

This table provides the meaning of the different states of the GSM LED *(see page 21)*:

GSM LED	LED Activity	Modem State
ON	LED on	The modem is powered and is ready to function, but has not yet been recognized by the network. This occurs when the PIN code has not been entered or the antenna is not connected.
	LED flashing (once every 2 seconds)	The modem is powered and the PIN code is active. The network recognizes the modem and is ready to make or receive a call (Idle mode).
	LED flashing (once a second)	The modem is powered and currently in communication (Voice, data, or fax).
OFF	LED off	The modem is not powered or is in the RESET phase.

Chapter 5
Modem Communication

Overview

This chapter describes the verifications and the AT commands in SR2 MOD02/03 modem.

What Is in This Chapter?

This chapter contains the following sections:

Section 5.1
Verification

Modem Communication Verification

General Description

Connect the RS 232 on the PC COM port.

Configure the DTE RS 232 port according to the type of the modem, as described in the table:

Parameters	Description	
	Zelio Logic (SR2 MOD02)	Twido (SR2 MOD03)
Data rate	115200 bauds	19200 bauds
Data size	7 bits	8 bits
Parity	Even parity	No parity
Stop bits	1 Stop bit	1 Stop bit
Flow control	hardware flow control activated	hardware flow control deactivated
AT commands echo	Echo deactivated	Echo deactivated
DSR signal	DSR 1	DSR OFF
Ring register	S0 = 0 (no automatic answer)	S0 = 2 (answer after 2 rings)

Enter the command `AT(CR)` with the Windows hyperterminal communication application. The modem responds with `OK`.

If the modem does not respond, then:
- Verify the RS 232 connection between DTE and the modem (DCE).
- Verify the configuration of the COM port on the DTE.

Examples of AT Commands

Some of the AT commands that can be sent to the modem once the communication is established and verified are given here:
- `AT+CGSN`: The modem responds with a 15-digit number.
- `AT+CPIN = xxxx`: Enter the code of the SIM card xxxx (if active).
- `AT+CSQ`: Verify the GSM signal reception level.
- `AT+CREG?`: Verify the registration of the modem on the network.
- `ATD<telephone number>`: Start a voice call.
- `ATH`: Hang-up (end the call).

For more information about AT commands and their associated parameters, refer to Appendix A *(see page 59)*.

GSM Receive Signal Quality Verification

General Description

The modem establishes a call, only if the received GSM signal is of a sufficient level. The `AT+CSQ` command restores the reception level (rssi) of the signal sent by the closest GSM base transceiver station (BTS), and the receive bit error rate (ber).

The command `AT+CSQ` restores the signal level from the BTS on the subscribed operator network when it is used with a SIM card and the PIN code is entered.

The use of this command without a SIM card simply indicates the closest BTS, as the modem cannot identify the current subscription. Thus it is advisable to do this test with the SIM card present.

`AT+CSQ` Command and Responses

Enter the command `AT+CSQ`, using a communication application to verify the GSM signal quality.

The response is `+CSQ: <rssi>,<ber>`, where:
- `<rssi>` = indicates the reception level
- `<ber>` = receive bit error rate

This table lists the values to verify the `<rssi>` value:

`<rssi>` Value	Gain (dBm)	Interpretation	`<ber>` Value	Interpretation
0	–113 dBm	Insufficient	0...7	See standard ETSI GSM 05.08
1...10	–111...–95 dBm	Insufficient	–	–
11...30	–95...–53 dBm	Sufficient	–	–
31 (max)	–51 dBm	Ideal	–	–
99	–	Unknown/not detectable	99	Unknown/not detectable

Reception Level for the Modem

The GSM will function properly with a minimum `<rssi>` value from 11...15. The signal value below 10 is insufficient. The modem cannot function depending on the geographical situation or the mobility of the vehicle. The signal value above 15 is sufficient to establish a connection.

For more information about AT commands, refer to Appendix A .

PIN Code Verification

General Description

The PIN code is necessary to make or receive a call from the GSM network. You can modify the PIN code and it is stored on the SIM card.

`AT+CPIN?` Command and Response

Enter the command AT+CPIN?, using a communication application to verify the previously entered PIN code.

This table describes the main responses from the modem:

Command	Response	Interpretation
AT+CPIN?	+CPIN: ERROR	The SIM card is absent or unknown.
	+CPIN: READY	The PIN code is correct.
	+CPIN: SIM PIN	The PIN code is incorrect or not yet entered
	+CPIN: SIM PUK	The PUK code is required

For more information about AT commands, refer to Appendix A .

Verifying Modem Registration on GSM Network

General Description

For this verification, confirm that a valid SIM card is present in the SIM card reader of the modem.

AT Commands for Modem Registration Verification

Enter the given AT commands, using a communication application:
- `AT+CPIN = xxxx`: Enter the PIN code with the command. The operator has 3 attempts to enter the PIN code correctly. After the third attempt, only the PUK code (supplied by the operator) allows a new PIN code to be entered.
- `AT+CREG?`: This verifies the network registration status. The response is in the format `+CREG: <mode>,<stat>`, where:
  - `<Mode>` = unsolicited registration message configuration
  - `<Stat>` = registration status

This table describes the main responses from the modem:

Command	Response	Interpretation
AT+CREG?	+CREG: 0,0	The modem is not recognized by the network.
	+CREG: 0,2	The modem is searching for a network operator.
	+CREG: 0,1	The modem is GSM attached to a local operator.
	+CREG: 0,5	The modem is GSM attached to an operator in roaming mode.

NOTE: If the modem does not register, verify the antenna connection and the receive signal level.

For more information about AT commands, refer to Appendix A .

Section 5.2
AT Commands

Overview

This section provides information about the AT commands that is used for configuring and using the SR2 MOD02/03 modem.

What Is in This Section?

This section contains the following topics:

Main AT Commands (HAYES)

Description

This table describes the main AT commands useful for the control of the modem:

Description	AT Command	Response	Interpretation
Enter the PIN code	AT+CPIN = xxxx (xxxx = PIN code)	OK	PIN code accepted
		+CME ERROR: 16	PIN code incorrect[1]
		+CME ERROR: 3	PIN code already entered[1]
Verification of GSM network registration	AT+CREG?	+CREG: 0,1	The modem is GSM attached to a local operator
		+CREG: 0,5	The modem is GSM attached to an operator in roaming mode
		+CREG: 0,2	The modem is searching for a network operator
		+CREG: 0,0	The modem is not recognized by the network
Reception of an incoming call[2]	ATA	OK	Reply to the call
Make a voice call	ATD<telephone number>; **NOTE:** The semicolon at the end of the sequence specifies a voice call.	OK	Communication established
		+CME ERROR: 11	PIN code not entered
		+CME ERROR: 3	There is no credit or the communication has already been established
Make an emergency call (112)	ATD112;	OK	Communication established
Lost communication	–	NO CARRIER	–
Hang-up	ATH	OK	–

(1) The AT command AT+CMEE = 1 allows display of extended detected error codes. The AT command AT+WIND = 63 allows display of the change of status of the SIM card and to check states of the modem drivers.

(2) The AT command AT+CRC = 1 displays more detailed ring information indicating call type (voice, data, or fax) of an incoming call. These commands are saved with the command AT&W. For example: For VOICE: +CRING: VOICE, for DATA: +CRING: REL ASYNC, and for FAX: +CRING: FAX

For more information about AT commands, refer to Appendix A .

Deactivated AT Commands ECHO

Description

In case no echo returns, when the operator enters an AT command, it could be that:
● The echo function of the modem is deactivated (setting by default).
● The local echo of the communication application is not activated.

NOTE: The echo is configured by the command `ATE` and requires a back-up with the command `AT&W`.

Activation of Modem Echo

Enter the command `ATE` to activate the modem echo.

Execute the given actions when using a communication application to send AT commands to the modem:
● Deactivate the local echo in your communication application.
● Activate the modem echo (enter the command `ATE1`).

NOTE: For a communication machine to machine with the modem, it is recommended to deactivate the modem echo (enter the command `ATE0`) to avoid the CPU from getting redundant responses.

For more information about the echo AT command refer to Appendix A .

Chapter 6
Troubleshooting

Troubleshooting

Removing Power of the Unit

It is ill-advised to remove power to the modem while in communication or dialog without first finishing the communication and then detaching from the network.

⚠ CAUTION
LOSS OF DATA
Do not intentionally remove power to the modem and/or the control system that it is connected to during on-going communications over the modem.
Failure to follow these instructions can result in injury or equipment damage.

To help avoid network congestion when it is required to remove power from the modem, it is necessary to follow the given steps:
- Execute the command AT+CPOF. In case this is not done correctly, the modem can remain registered on the network.
- Send the command AT+CPOF or AT+CFUN = 0 (identical functions) before removing power in dialog mode (no communication).

The modem returns OK and is no longer registered on the network. The radio module shifts into the standby mode and then the power is removed.

RS 232 (V24) Communication Troubleshooting

The table describes a list of possible causes and solutions, in case the modem does not respond to any of the AT commands via the RS 232:

Modem Returns	Verify	Action
Nothing	The modem is correctly powered.	Ensure that the modem is connected to an external regulated power source between 5.5...32 Vdc. For more details, refer Power supply *(see page 27)*.
	The serial cable is connected at both ends (PC and modem).	Verify the connection of the serial cable.
	The serial cable is correctly wired. Refer to the Table *(see page 22)* describing the connector pin assignment of 4-pins micro FIT female connector.	Wire the serial cable. Refer to the Table *(see page 22)* describing the connector pin assignment of 4-pins micro FIT female connector.
Nothing or random characters	The communication terminal is correctly configured on the PC.	Ensure that the terminal configuration corresponds to that of the modem. Refer to the Modem Communication Verification *(see page 45)* for factory configuration.
	There is no other application using the same port thus creating a conflict.	Close the conflicting application.
	The modem echo is deactivated and without message reporting.	Enter the command ATE1Q0 followed by AT&W if a backup is required.

ERROR Message

The modem returns the message ERROR (in response to an AT command) in the given cases:
- The COM port is not directed to the modem but to another modem. Enter the command AT1. The response is WAVECOM MODEM. All other responses indicate a dialog with another modem. Verify the COM port used in the communications application.
- The syntax of the AT command is incorrect. Re-enter the command. (Refer to Appendix A *(see page 59)* for a list of AT commands).
- When the syntax of the AT command is correct, but with incorrect parameters follow the given steps:
  - Enter the command AT+CMEE = 1 to obtain a detected error message with its detected error code instead of the simple ERROR message
  - Enter the AT command which previously caused an inaccuracy to obtain the detected error code again. In the case of an error found, the response is in the form:
    +CME ERROR: <error code> or +CMS ERROR: <error code>

For more information about detected error codes returned by the command AT+CMEE, refer to Appendix A *(see page 59)*.

NOTE: It is advised to let the modem return detected error codes (enter the command AT+CMEE = 1).

NO CARRIER Message

The table describes a list of possible causes and solutions, in case the modem responds with the NO CARRIER message after an attempted call:

Modem Returns	Verify That	Action
NO CARRIER	The received GSM signal is strong enough.	Verify the received signal quality. Refer the GSM Receive Signal Quality Verification *(see page 46)*.
	The modem is registered on the network.	Verify network registration. Refer the Modem Registration Verification *(see page 48)*.
	The antenna is correctly connected.	Check the GSM antenna installation.
NO CARRIER (when attempting a voice call)	The semi-colon (;) has been entered immediately after the telephone number in the AT command.	Ensure that the semi-colon (;) has been entered immediately after the telephone number in the AT command. For example: ATD0123456789
NO CARRIER (when attempting a data call)	The SIM card is configured for data/fax calls.	Ensure that the SIM card is allowed to make data/fax calls (check with the SIM card supplier).
	The selected modulation type is supported by the called number.	Ensure that the selected modulation type is supported by the called number.
	The selected modulation type is supported by the network.	Ensure that the selected modulation type is supported by the network. If not, select a compatible modulation type with the command `AT+CBST = 0,0,1`.[(1)]
1 For further information concerning AT commands, refer to Appendix A *(see page 59)*.		

Use the command `AT+CEER` to see the extended found error codes.

This table describes a list of detected error codes and their meanings:

Error Code	Description	Observations
1	Unassigned (unallocated) number	–
16	Normal call clearing	–
17	User busy	–
18	No user responding	–
19	User alerting, no answer	–
21	Call rejected	–
22	Number changed	–
31	Normal, unspecified	–
50	Requested facility not subscribed	Check the subscription (data subscription availability).
68	ACM ≥ ACMmax	No more SIM card or credit card expired.
252	Call barring on outgoing calls	–
253	Call barring on incoming calls	–
3, 6, 8, 29, 34, 38, 41, 42, 43, 44, 47, 49, 57, 58, 63, 65, 69, 70, 79, 254	Network cause	Refer to Appendix A *(see page 59)* or check with the operator.

NOTE: For codes and information, refer to Appendix A *(see page 59)*.

Appendices

What Is in This Appendix?

The appendix contains the following chapters:

Appendix A
AT Commands

Overview

This appendix describes commonly used AT command based messages between an application and the SR2 modems.

For mor information about AT commands, refer to the "AT® Commands Interface Guide for Open AT Firmware V6.63" at http://www.ercogener.com.

What Is in This Chapter?

This chapter contains the following topics:

Basic AT Commands

Introduction

This topic describes the following basic AT command based messages between an application and the SR2 modems:
- Attention Command *(see page 60)*
- Repeat Last Command *(see page 60)*
- Manufacturer Identification *(see page 61)*
- Hardware Version *(see page 61)*
- Request Revision Identification *(see page 61)*
- Request Identification Information *(see page 61)*
- Save Configuration *(see page 63)*
- Restore Factory Settings *(see page 64)*
- Restore Configuration from non-volatile memory *(see page 64)*
- Display Configuration *(see page 64)*
- Address Type Selection *(see page 65)*

Attention Command

The Attention Command queries the modem to affirm that it is present and in communication with the application.

Command Format	Command Example	Response Example
`AT`	AT	`OK`

Repeat Last Command

The Repeat Last Command repeats the last command of the open session.

NOTE: The A/ command itself cannot be repeated.

If the Repeat Last Command is the first command of the open session, the response is `OK` without any treatment.

Command Format	Command Example	Response Example
`A/`	A/	`OK`

Manufacturer Identification

This command returns the identification of the manufacturer of the communication module.

If the Manufacturer Identification command is the first command of the open session, the response is `OK` without any treatment.

Command Format	Command Example	Response Example
AT+CGMI	AT+CGMI	Sierra Wireless OK

Hardware Version

This command returns the hardware version of the communication module.

Command Format	Command Example	Response Example
AT+WHWV	AT+WHWV	Hardware Version 4.14 OK

Request Revision Identification

This command returns the firmware version of the embedded module.

Command Format	Command Example	Response Example
AT+CGMR	AT+CGMR	R7.43.0.201003261552.WMP5 0 2139952 032610 15:52 OK

Defined Values:

SW release	Software release version number
WCPU	Type of module embedded
size	Firmware size in bytes
date	Date (mmddyy) of firmware generation
time	Time (hh:mm) of firmware generation

Request Identification Information

This command returns specific information on one or more lines of text concerning the embedded module.

Command Format	Command Example	Response Example
ATI<n>	ATI6	DATA RATES: AUTOBAUD,300,1200,1200/75, 2400,4800,9600,14400

Defined Values:

0	Embedded module with the 2nd core: ● display manufacturer identification (equivalent to +CGMI, refer to these commands for more precision) Embedded module without the 2nd core: ● display manufacturer followed by model identification (equivalent to +CGMI and +CGMM, refer to these commands for more precision)
3	Display revision identification (equivalent to +CGMR)
4	Display embedded module configuration in RAM (equivalent to &V0)
5	Display embedded module configuration in EEPROM (equivalent to &V1)
6	Display embedded module data features. Lists the supported data rates, data modes and fax classes
7	Display embedded module voice features
8	Embedded module with the 2nd core: ● display software version followed by the chip Id Embedded module without the 2nd core: ● "OK"

9	Display component details: Downloader, Firmware, embedded Open® AT application (Developer Studio version used to build it, Integrated Plug In version), memory. The response is divided into four groups: ● <Component> ● <Version>[, <Name>, <Company>, <Size>, <TimeStamp>, <Checksum>, <Offset>] ● [-<SubComponent>, <SubComponentVersion>] ● <MemoryType>, <MemorySize> [<InfoTage>, <InfoValue>]

	Parameter	Data type	Description
	<Component>	ascii string	embedded software component type; values: "DWL", "FW", "OAT", "3G+"
	<Version>	ASCII string	version of the software component
	<Name>	ASCII string	component name
	<Company>	ASCII string	component company
	<Size>	integer	component size in bytes
	<TimeStamp>	ASCII string	component time stamp
	<Checksum>	ASCII string	component check sum
	<Offset>	ASCII string	offset address of the component
	<SubComponent>	ASCII string	subcomponent name: this field is filled by Developer Studio (supported from version 1.1)
	<SubComponent Version>	ASCII string	subcomponent version: this field is filled by Developer Studio (supported from version 1.1)
	<MemoryType>	ASCII string	"ROM" or "RAM"
	<MemorySize>	integer	size of the <MemoryType> in bytes, in hexadecimal, set at the upper roundish value (100000 = 8 Mb, 200000 = 16 Mb, 400000 = 32 Mb, 800000 = 64 Mb, …)
	<InfoTag>	ASCII string	Information Tag, the value is the parameter <InfoValue>. Current supported value: "DWLNAME")
	<InfoValue>	ASCII string	Information Value. For "DWLNAME" information Tag: Type of the correct DWL file type to be downloaded in the embedded module, based on the product name.)

Save Configuration

This command writes the active configuration to non-volatile memory (EEPROM).

Command Format	Command Example	Response Example
AT&W	AT&W	OK

Restore Factory Settings

This command restores configuration settings to the factory default values.

Command Format	Command Example	Response Example
AT&F	AT&F	OK

Restore Configuration from non-volatile memory

This command restores the previously saved configuration from non-volatile memory (EEPROM).

Command Format	Command Example	Response Example
ATZ	ATZ	OK

Display Configuration

This command returns the saved configuration of the embedded module.

Command Format	Command Example	Response Example
AT&V[<n>]	AT&V	Q:0 V:1 S0:000 S2:043 S3:013 S4:010 S5:008 +CR:0 +CRC:0 +CMEE:0 +CBST:0,0,1 +SPEAKER:0 +ECHO:1,4 &C:1 &D:2 %C:0 +IPR:9600 +ICF:3,4 +IFC:2,2
NOTE: In the command format, <n> is an optional parameter.		

Defined Values:

0	Display the embedded module configuration in RAM (default value if no parameter provided)
1	Display the embedded module configuration in EEPROM
2	Display the embedded module factory configuration

NOTE: The +IPR value is not returned when <n> = 2.

Address Type Selection

This command specifies the type of number for dialing commands according to GSM specifications.

Command Format	Command Example	Response Example
AT+CSTA=<type>	AT+CSTA=145	OK
NOTE: In the above example, the international access code character "+" will be automatically added to the outgoing call.		

Defined Values:

129	ISDN / telephony numbering plan, national / international unknown. The '+' must be added to the number for international calls; otherwise it is assumed to be a national number.)
145	ISDN / telephony numbering plan, international number. Number is assumed to be international and will automatically have the '+' added to the dialing string.

NOTE: The +IPR value is not returned when <n> = 2.

Serial Port AT Commands

Introduction

This topic describes the following serial port AT command based messages between an application and the SR2 modems

- Echo *(see page 66)*
- Fixed DTE Rate (baud rate) *(see page 66)*
- Character Framing *(see page 68)*

Echo

This command is used to determine whether the embedded module echoes characters received by the application:

Command Format	Command Example	Response Example
`ATE[<n>]`	ATE1	`OK`
NOTE: In the above example, the international access code character "+" will be automatically added to the outgoing call.		

Defined Values:

0	Characters are not echoed (default value if <n> omitted).
1	Characters are echoed.

NOTE: The <n> parameter is stored in EEPROM using the Save Configuration *(see page 63)* (AT&W) command.

Fixed DTE Rate (baud rate)

This command specifies the data rate at which the embedded module will accept commands:

Command Format	Command Example	Response Example
`ATE+IPR=<rate>`	ATE+IPR=9600	`OK`
NOTE: In the above example, the data rate is set to 9600 bps.		

Defined Values:

0	Enables autobauding.
300	–
600	–
1200	–
2400	–
4800	–
9600	–
19200	–
38400	–
57600	–
115200	Command default value.
230400	–
460800	–
921600	–

NOTE:

- The <n> parameter is stored in EEPROM using the Save Configuration *(see page 63)* (AT&W) command.
- When starting up, if autobaud is enabled and no Attention *(see page 60)* (AT) command has yet been received, the product sends all unsolicited responses (like RING) at 9600 bauds.
- The serial autobaud feature is supported, and covers the following serial speeds (only): 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800, 921600 bps. Beyond those serial speeds, correct operation of the embedded module is not supported.
- Any AT command issued by the DTE must start with both capital 'A' and 'T, (or '/') or both lower case 'a' and 't' (or '/'), otherwise the DCE may return some characters and become desynchronized. If this happens, the DTE simply issues 'AT\r' (at 2400 or 4800 baud) once or twice or just 'AT' (at 9600 baud) to resynchronize the embedded module.
- The DTE waits for 1ms after receiving the last character of the AT response (which is always '\n' or 0x0A) to send a new AT command at either the same rate or a new rate. If this delay is ignored, the DCE can become desynchronized. Once again, sending 'AT\r' once or twice or just 'AT' causes the DCE to recover.

Character Framing)

This command is used to determine the local serial port start-stop (asynchronous) character framing used by the embedded module:

Command Format	Command Example	Response Example
`ATE+ICF=<format>,[<parity>]`	ATE+IPR=9600	`OK`
NOTE:		

- In the command format, <parity> is an optional parameter.
- In the above example, the response is 8 data bits, 1 parity, 1 stop, odd parity.

Defined Values:

<format>	
1	8 data, 2 stop, <parity> parameter is ignored
2	8 data, 1 parity, 1 stop, if no <parity> provided 3 is used by default as <parity> value.
3	8 data, 1 stop, <parity> parameter is ignored. This is the default value.
4	7 data, 2 stop, <parity> parameter is ignored.
5	7 data, 1 parity, 1 stop, if no <parity> provided, 3 (space) is used by default as <parity> value.
6	7 data, 1 stop, <parity> parameter is ignored.
<parity>	
0	Odd
1	Even
2	Mark
3	Space
4	None. This is the default value.

NOTE: The <format> and <parity> parameters are stored in EEPROM using the Save Configuration *(see page 63)* (AT&W) command, and the default values can be restored using the restore factory settings *(see page 64)* (AT&F) command.

Call AT Commands

Introduction

This topic describes the following call AT command based messages between an application and the SR2 modems:
- Dial Command *(see page 69)*
- Redial Last Telephone Number *(see page 71)*
- Answer Incoming Call *(see page 71)*
- Hang-Up Call *(see page 71)*
- Automatic Answer *(see page 71)*

Dial Command

This command is used to dial an outgoing call to a specific number. It also allows an application to dial emergency call numbers and specify emergency call codes.

According to 3GPP specifications, only several numbers should be considered as emergency numbers:
- without a SIM: 112, 911, 000, 08, 110, 999, 118 and 119
- with a SIM: 112, 911 and numbers present in the EFECC SIM file

All others numbers will be considered as GSM numbers.

The ATD command is used to set a voice, data or fax call. As per GSM 02.30, the dial command also controls supplementary services.

The following emergency numbers are available without a SIM card: 000, 08, 110, 112, 118, 119, 911 and 999.

The following Emergency Numbers are available with a SIM card:
- when EFECC file is missing from SIM: 112 and 911
- when SIM includes an EFECC file: 112, 911 and any emergency numbers available in the EFECC file

Command Format	Command Example	Response Example
`ADT<nb>,[<I>] [<G>] [;}`	ATD+33412345678	`CONNECT 9600`
NOTE: In the above example, the data call succeeds.		

Defined Values:

<nb>	Destination phone number (ASCII string) or GSM sequence 0-9,*,#,+,A,B,C,D,P
<l>	CLIR supplementary service subscription. If present, the CLIR supplementary service subscription is overridden temporarily for this call only: ● I = activate (disable presentation of own phone number to remote) ● i = deactivate (enable presentation of own phone number to remote)
<G>	CUG supplementary service information. If present, the CUG supplementary service information is overridden temporary for this call only: ● G = activate ● g = deactivate
<;>	Indicates a voice call. If omitted, data or fax call is assumed

NOTE:

● For an international number, the local international prefix does not need to be set (usually 00) but must be replaced by the '+' character.
● Note that some countries may have specific numbering rules for their GSM handset numbering.
● An outgoing call attempt can be refused if the AOC service is active and credit has expired (NO CARRIER).
● As per GSM 02.30, GSM sequences may be controlled using dial commands. These sequences can contain "*", "#", but ";" is forbidden in the sequence. For example, to invoke or suppress CLIR service temporally, ATD*31#<nb>[;] and ATD#31#<nb>[;] can be used (with „;? at the end, a voice call will be launched).
● If the FDN phonebook is activated, the call forwarding sequences are allowed only if they are present in the FDN.
● A category can be filled for an emergency call. To use this specificity, the following syntax should be used:
ATD<nb>#<category>
where:
   ● <nb> is the emergency call
   ● <category> is a bit field with the following description:
      - bit 1: police
      - bit 2: ambulance
      -bit 3: fire brigade
      - bit 4: marine guard
      - bit 5: mountain rescue
      - bit 6: manually initiated e-call
      - bit 7: automatically initiated e-call
      - bit 8: reserved, set to "0"

The <category> range is [1-127]. If an out of range value is filled and if the <nb> is an emergency call, this field is not taken into account by the embedded module and the emergency call is initiated (without this information).
If the <nb> number is not an emergency number, the <category> field is not taken into account and a normal call is initiated by the embedded module.
If bit 6 and bit 7 are set to 1, the embedded module automatically set bit 6 to 0 and keep bit 7 to 1.

Redial Last Telephone Number

This command is used by the application to redial the last number used in the dial command:

Command Format	Command Example	Response Example
ATDL	ATDL	0033412345678 OK

Answer Incoming Call

When the product receives a call, it sets the Ring Indicator signal and sends the ASCII "RING" or "+CRING: <type>" string to the application (+CRING if the cellular result code +CRC is enabled). Then it waits for the application to accept the call with the ATA command:

Command Format	Command Example	Response Example
ATA	ATA	OK

Hang-Up Call

The ATH (or ATH0) command is used by the application to disconnect the remote user. In the case of multiple calls, all calls are released (active, on-hold and waiting calls):

Command Format	Command Example	Response Example
ATH[<n>]	ATH	OK

Defined Values:

0	Ask for disconnection.
1	Ask for outgoing call disconnection.

Automatic Answer

This command determines and controls the product automatic answering mode:

Command Format	Command Example	Response Example
ATS0[<value>]	ATS0=3	OK
NOTE: In the example, an automatic answer occurs after three rings.		

Defined Values:

<value>	The number of rings before automatically answering a call.

Appendix B
Modem Configuration
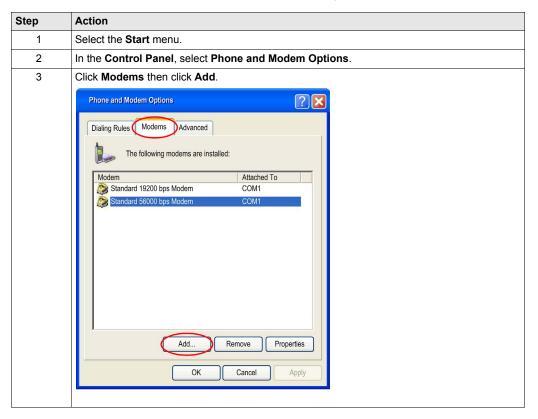
Reconfiguring the Modem

Modem Configuration
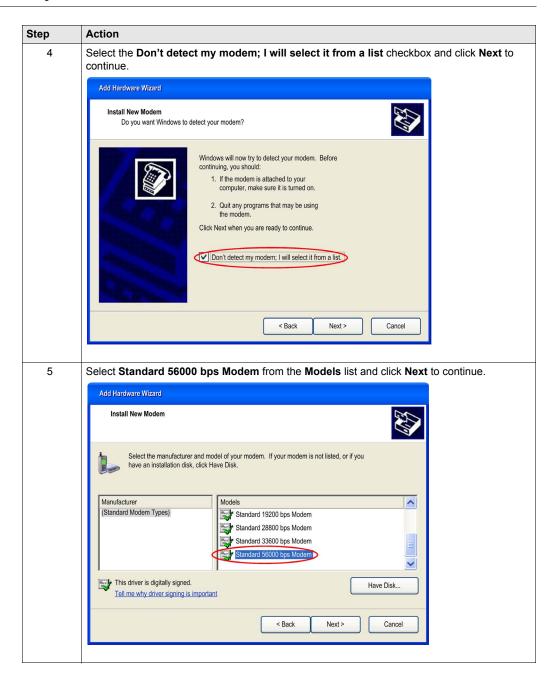
Your SR2 MOD02/03 modem comes pre-configured from the factory for use with either the Zelio or Twido controllers. However, if you need to edit the default modem configuration, or if the modem loses its configuration, refer to the following procedure for reconfiguring your modem.
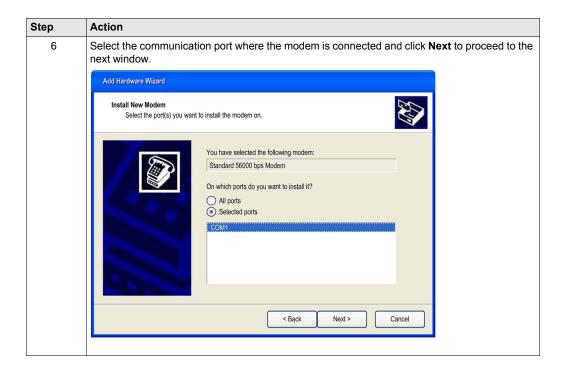
For more information, refer to Modem Communication Verification *(see page 45)*.

This table describes the steps to follow to add a modem using Windows:

Step	Action
1	Select the **Start** menu.
2	In the **Control Panel**, select **Phone and Modem Options**.
3	Click **Modems** then click **Add**.

Step	Action
4	Select the **Don't detect my modem; I will select it from a list** checkbox and click **Next** to continue.
5	Select **Standard 56000 bps Modem** from the **Models** list and click **Next** to continue.

Step	Action
6	Select the communication port where the modem is connected and click **Next** to proceed to the next window.

Step	Action
7	After installation, it is necessary to configure the communication port link to the modem. Select the **Standard 56000 bps Modem** from the modem list and click **Properties** tab.

Step	Action
8	Click the **Modem** menu tab in the **Standard 56000 bps Modem Properties** window. Set **115200** as the **Maximum Port Speed**.

Step	Action
9	Select the **Advanced** menu tab in the **Standard 56000 bps Modem Properties** window and click **Change default preferences**. ![Standard 56000 bps Modem Properties window showing the Advanced tab selected with Extra Settings section and Change Default Preferences button circled]

Step	Action
10	Click the **General** menu tab on the **Standard 56000 bps Modem Default Preferences** window. Set the **Port Speed** and **Flow control** to **115200** and **None** respectively. ![Standard 56000 bps Modem Default Preferences dialog showing General tab selected, Port speed set to 115200, and Flow control set to None]

Step	Action
11	Click the **Advanced** menu tab on the **Standard 56000 bps Modem Default Preferences** window. Enter the **Hardware settings** parameters according to the modem configuration *(see page 45)* (for SR2MOD02 and SR2MOD03). **Standard 56000 bps Modem Default Preferences** General Advanced Hardware Settings Data bits: 7 Parity: Even Stop bits: 1 Modulation: OK Cancel
12	Restart the PC and modem.

Glossary

A

AC
alternative current

ACM
accumulated call meter

AT
attention (prefix for modem commands)

B

BTS
base transceiver station

C

CLK
clock

CMOS
complementary metal oxide semiconductor

CS
coding scheme

CTS
clear to send

D

dB
decibel

dBc
decibel relative to the carrier power

dBi
decibel relative to an isotropic radiator

dBm
decibel relative to one milli-watt

DC

   direct current

DCD

   data carrier detect

DCE

   data communication equipment

DCS

   digital cellular system

DSR

   data set ready

DTE

   data terminal equipment

DTMF

   dual tone multi-frequency

DTR

   data terminal ready

E

E-GSM

   extended GSM

EEPROM

   electrically erasable programmable read-only memory

EFR

   enhanced full rate

EMC

   electromagnetic compatibility

EMI

   electromagnetic interference

ESD

   electrostatic discharges

ETSI

   European telecommunications standards institute

F

FIT

series of connectors (micro-FIT)

FR

full rate

FTA

full type approval

G

GCF

global certification forum

GND

protective ground

GPIO

general-purpose input output

GSM

global system for mobile communications

H

HR

half rate

I

I

input

I/O

input / output

IEC

international electrical commission

IMEI

international mobile equipment identification

L

LED

light emitting diode

Little-endian

low-order byte of the number is stored in memory at the lowest address, and the high-order byte at the highest address.

M

MAX

maximum

ME

mobile equipment

MIC

microphone

MICRO FIT

family of connectors from Molex

MIN

minimum

MNP

Microcom networking protocol

MO

mobile originated

MS

mobile station

MT

mobile terminated

N

NOM

nominal

O

O

output

P

Pa

pascal (for speaker sound pressure measurements)

PBCCH

packet broadcast control channel

PC

personal computer

PCL

power control level

PDP

packet data protocol

PIN

personal identity number

PLMN

public land mobile network

PUK

personal unblocking key

R

RF

radio frequency

RFI

radio frequency interference

RI

ring indicator

RMS

root mean square

RTS

request to send

RX

receive

S

SIM

subscriber identification module

SMA

subminiature version A RF connector

SMS

short message service

SNR

signal-to-noise ratio

SPI

serial peripheral interface

SPK

speaker

SPL

sound pressure level

SRAM

static RAM

T

TDMA

time division multiple access

TPC/IP

transmission control protocol / Internet protocol

TU

typical urban fading profile

TUHigh

typical urban, high speed fading profile

TX

transmit

TYP

typical

U

UTC

universal time clock

V

VSWR

voltage stationary wave ratio